# Digital Arizona

## A Sustainable *Leveraged* Broadband Plan For Accelerating Arizona's Economic Recovery and Growth

**And the Transformation of Education, Healthcare and Business**

**Arizona Broadband Project**

**Arizona Strategic Enterprise Technology (ASET) Office**

**Arizona Department Of Administration**

# Increasing Arizona's Broadband Capacity

## Broadband Is Not An Inalienable Right

Neither are:

- Highways
- Electricity
- Clean water

Yet the universal availability of these *essential infrastructures* has proven to be fundamental to our country's economic growth, competitiveness and well-being

# The New Essential

Broadband Internet Capacity Is

The *New* Essential Infrastructure

- It is required for:
  - Improving education outcomes while lowering costs
  - Improving healthcare delivery while lowering costs
  - Attracting large businesses and growing small ones
  - Enhancing government services while lowering costs
  - Better public safety and security
  - Increased quality of life for Arizona's citizens

# How Limited Government Can Accelerate Broadband Capacity and Related Economic Growth?

- Leverage taxpayer owned assets to reduce the cost of private sector broadband buildout in underserved areas
  - Leverage public rights-of-way
    - Two highways for (nearly) the cost of one
    - Canals
    - Power lines
    - Railroads
- Coordinate, simplify and accelerate broadband permitting and easements
  - Establish Digital Arizona Infrastructure Office
    - Create and enforce reasonable and uniform practices for broadband related permitting and easement processes
- Transition existing $6.3 M Federal grant into sustainably funded mechanism for acceleration of digital capacity build-out

# Digital Arizona Council

## Executive Steering Committee

Three Representatives from Each Stake-Holder Representative Group

**Chair: State CIO**

**Broadband Provider Representatives**

7 Members:

- ✓ ILECS
- ✓ Cable Companies
- ✓ Cellular/LTE
- ✓ Fixed Wireless
- ✓ Satellite
- ✓ Wholesale Backhaul
- ✓ Urban
- ✓ Rural

**Business/Community Citizen Representatives**

7 Members:

- ✓ Health Care
- ✓ Education
- ✓ Manufacturing
- ✓ Tourism
- ✓ Retail
- ✓ Rural Community
- ✓ Tribal Community
- ✓ Urban Community

**Governments Representatives**

7 Members:

- ✓ State Agencies as Customers
- ✓ State Agencies as Policy Makers
- ✓ Local Governments as Customers
- ✓ Local Governments as Policy Makers

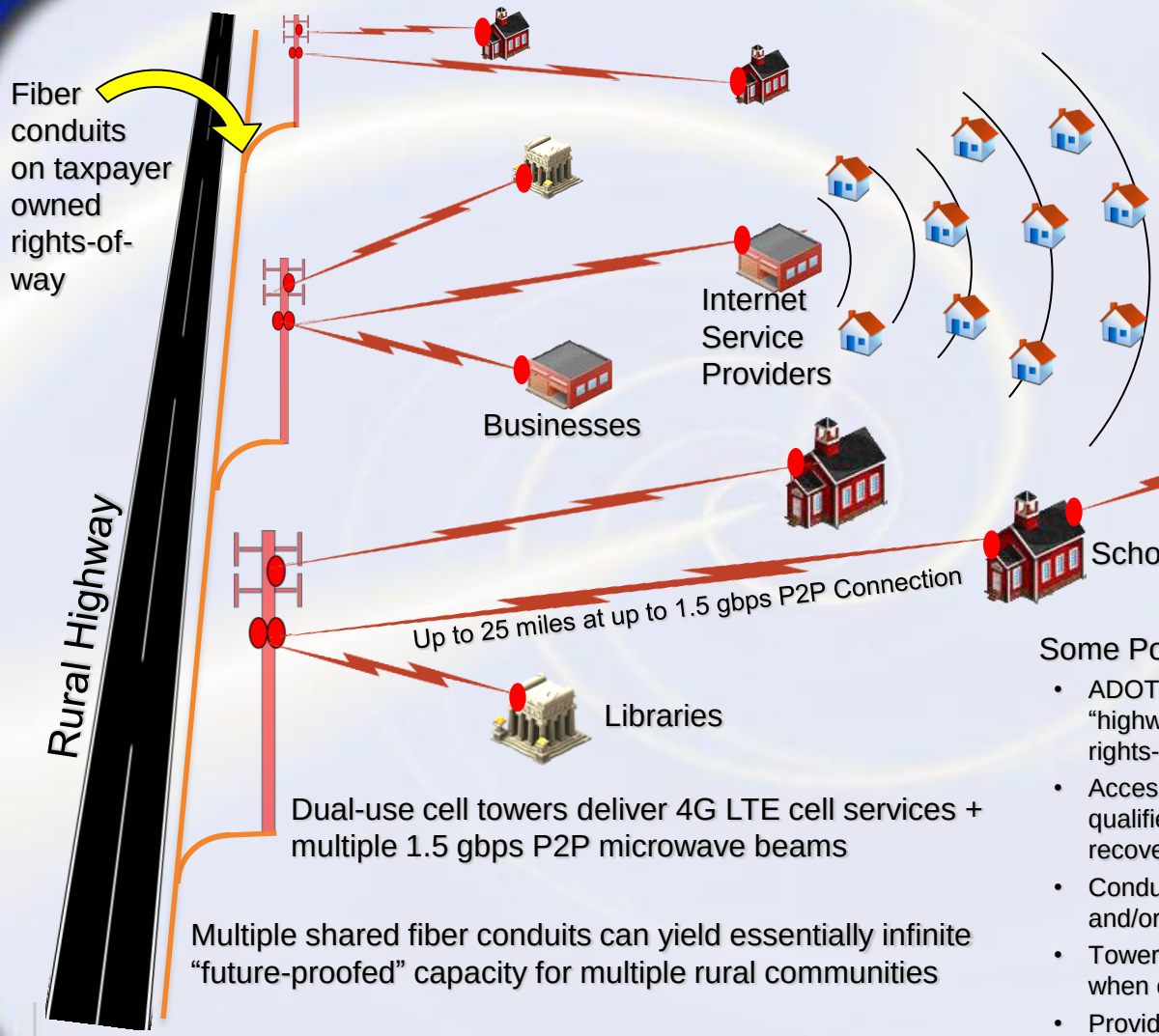
# Council Task Groups

- Public policy recommendations
  - State Broadband Strategic Plan and Map use
  - Best policy practices
    - Implement independent rights-of-way study recommendations
    - Tax policy
    - Sustainable funding model
  - Sustainability of broadband capacity growth by private sector
- Rural community engagement
  - Demand aggregation
  - Middle mile solutions
  - Provider ROI enhancement
- Economic development via broadband
  - Technical assistance to communities
  - Application templates
    - eLearning -- distance learning
    - eHealth
    - eCommerce
    - eGovernment
    - eQuality-of-life

# Our Measures of Success for Digital Arizona Project

- Non-metro broadband capacity increased by 20% by 2014 over current baseline
- Non-metro broadband adoption increased by 20% over current baseline by 2014
- Increased middle mile capacity [both gigabits per sec per mile (Gbps) and actual route miles] increased by 100% against current baseline by 2015
- Increase miles of public rights-of-way reuse by 200% by 2014
- Minimum of 1 Gbps to every school in Arizona by 2015
- Sustainable funding model and Digital Arizona Infrastructure Office established by 2012

# The Tactical Possibilities (Incremental Scalability is Everything)




Some Possibilities:

- ADOT builds and maintains fiber-conduit "highways" along the public's highway rights-of-ways on a "cost-recovery" basis
- Access to conduits is shared among all qualified broadband providers on a cost recovery basis
- Conduit funding comes from providers and/or Broadband Universal Fund
- Tower space is a shared provider resource when connected to highway conduits
- Providers build P2P links with newly acceptable ROIs

# Conduit Innerduct
# Low Cost High Capacity Wireless

# The Details

- Use of Federal Interstates currently blocked by feds
- We can use Interstate frontage roads and state and county highways
- High-capacity P2P microwave coverage distances from highways -- 20 to 40 miles in any direction
- Middle-mile trench/conduit capacity – essentially infinite (as providers incrementally blow fiber through conduits)
- P2P microwave capacity *per cell tower* to community locations -- 1 to 15 Gbps (as providers incrementally build-out links)

# 5 Year Build-out Estimate

- ~ $15K to $40K per rural conduit trench mile (*equivalent to the cost of highway paint stripes*)
- ~ 2,000 to 3,000 rural trench miles to reach all Arizona communities
- ~ $10M to $15M per year investment
- Entire state could be covered in 5 to 7 years
- Program can then be “sunset” to maintenance only mode

# GOVnet Status

- All approvals / permits obtained statewide
- Construction has begun
- State-wide network fully operational in 20 months
- Limited to middle-mile and CAI use.
- Great start on over-all Digital Arizona Plan

# What About Libraries?

- Important rural community centers
  - Computer literacy training
  - Internet / computer access for un-served
  - Adult distance learning centers
  - Possible tele-health centers
  - eRate funding available
- Libraries can be anchor's for community demand aggregation and broadband development grants

# Why Fiber Conduit Capacity is Essentially Infinite (and why it matters)

- The most expensive aspect of fiber is the right-of-way (time and money)
- Next most expensive is digging a trench
- Conduit is just plastic pipe (inexpensive)
- Blowing fiber through existing conduit (relatively inexpensive)
- Multiple conduits in one trench mean providers don't interfere with each other's services
- Scalability:
  - Potential of approximately 14 thousand gigabits per second per single fiber strand -- (9 thousand 1.5-gigabit beams per strand)
  - up to 96+ strands per conduit innerduct channel
  - up to 8 innerduct channels per conduit
  - up to 8 conduits per trench
- One 8 conduit trench has the potential for fully redundant capacity of 43 million gigabits per second *or* 21 million 1.5 gb/s beams per route
- Each fiber strand has the capacity of the entire wireless spectrum

# How Much is 1.5 Gigabits per Second?

- Fifty 1.5 gigabit per second beams (75 Gbps) *from just 5 cell towers* (10 beams each) into a community translates to:
  - Three thousand 25 megabit simultaneous Internet connections
  - Nine thousand simultaneous different high-def, large-screen video streams
  - Eighteen thousand simultaneous iPad video streams
  - 4500 Internet/IPTV subscribers

# Proposed Legislation

## Digital Arizona Infrastructure Office Bill

- What is needed:

–Establish Digital Arizona Infrastructure Office (to manage funding, conduit build-outs with ADOT and provider access to conduit)

–Establish Digital Arizona Council (formerly ABDC) as the Office's advisory council

–Possibly take back of FCC ROW pole attachment rule making/adjudication

- The Office will:

–Focus on strategic planning, prioritization and funding for broadband infrastructure projects

–Provide guidelines and best practices for broadband infrastructure easements, ROW and permitting processes

–adjudicate ROW and permitting process disputes

# Proposed Legislation

## Digital Highway Bill

- What is needed:
  - Broaden the definition of “transportation” to include transportation of information (reduces need to renegotiate access to underlying highway easements)
  - Enables ADOT to install and manage broadband conduits in conjunction with, and in addition to, its rural highway construction projects
  - Establishes planning mechanisms for completing continuous conduit builds
  - Establishes competitively-neutral cost-recovery-based availability to incent and leverage private sector broadband provider investments
- What it does:
  - Makes available low cost middle-mile fiber conduits and ROW access in rural Arizona (Two Highways for [nearly] The Cost Of One)
  - Makes provider ROIs feasible for last-mile and 4G mobile builds in rural Arizona
  - Makes available conduits for ADOT Intelligent Transportation System
  - Makes available affordable rural back-haul for public safety and DHS use

# Proposed Legislation

## Sustainable Funding - An Issue Under Discussion

- What is needed:
  - –Estimated at about $10 to $15 million per year for ~ 5 to 7 years
- What it would do:
  - –Creates permanent, easily accessed, broadband easements and ROW for providers
  - –Rapidly expands rural high-capacity broadband infrastructure
  - –Accelerates Digital Arizona's economic recovery, growth and opportunity
  - –Create new Information Highway Infrastructure for 1% to 2% of asphalt Highway Infrastructure

# Conclusion

We are creating the possibilities for bringing into existence -

*A fundamental and essential*
*21st century rural infrastructure*
*at 1% to 2% of the cost*
*of the historical investments*
*made in our asphalt infrastructure*

# *Questions?*

# Contact Information

## www.azbroadband.gov


Aaron Sandeen
State CIO
Chair: Broadband Development Council
aaron.sandeen@azdoa.gov
602-542-2250

Michael Golden
Director, Broadband Planning
Digital Arizona Project
mike.golden@azdoa.gov
928-301-0136

Galen Updike
Broadband Development Manager
galen.updike@azdoa.gov
602-364-4794

Jeffrey Crane
Project Manager
jeffery.crane@azdoa.gov
480-652-0384

Eric Thomas
Outreach Manager
eric.thomas@azdoa.gov
602-264-4858